ABSTRACT OF THE DISCLOSURE

The present invention is directed to a method of detecting a neurodegenerative disease in a mammal by activating brain tissue of the mammal by application of radiation under conditions effective to promote a simultaneous multiphoton excitation of the brain tissue and to emit a fluorescence characteristic. The fluorescence characteristic is then compared to a standard fluorescence emitted by exciting healthy brain tissue of the mammal under the same conditions used to carry out the activating step. Brain tissue where the fluorescence characteristic differs from the standard fluorescence is identified as potentially having a neurodegenerative disease. Another aspect of the present invention is directed to a method of producing an image of brain tissue from a mammal by activating brain tissue of a mammal with radiation applied under conditions effective to promote a simultaneous multiphoton excitation of the brain tissue and to produce fluorescence. The fluorescence is then collected to produce an image of the brain tissue.